Claims:

1. **Flat refrigerating unit** for use with device, server or circuit cabinets or other essentially closed housing arrays for acceptance of heat-generating equipment,
   (a) in which the temperature of heated air (SL)—in a countercurrent (L4; L3; k_1; k_2, etc.) with refrigerating air (KL) flowing in the opposite direction—can be reduced without the refrigerating air coming into contact with the air flow (L1, L3, L5) to be cooled;
   characterized in that
   (a) a refrigerating air flow (KL, L4, AL) is conducted in an essentially straight line through chambers (k_2, k_4, k_6, k_8) of the refrigerating unit, between an outlet of at least one first fan (30, 31) on the input side of the refrigerating air flow (KL) and an inlet of at least one second fan (40, 41) on the outlet side (AL) of the refrigerating airflow.

2. **Flat refrigerating unit** for use with device, server or circuit cabinets or other essentially closed housing arrays for acceptance of heat-generating equipment, in which the temperature of heated air (SL)—in a countercurrent (L4; L3; k_1; k_2, etc.) with refrigerating air (KL) flowing in the opposite direction—can be reduced without the refrigerating air coming into contact with the air flow (L1, L3, L5) to be cooled;
   characterized in that
   (a) the flow of air to be cooled (SL, L1, L3, L5, DL) is only diverted twice, in an essentially right angle;
      (aa) **from** an input flow direction (SL), which progresses essentially in a direction of the axis of rotation of a third fan (10);
      (bb) **into** a plurality of chambers (k1, k3, k5, k7) of the refrigerating unit progressing in parallel;
      (cc) **out of** the chambers (k1, k3, k5, k7) progressing in parallel **into** an outlet flow direction (DL), which extends essentially perpendicular to the parallel chambers;
   (b) to form a U-shaped flow path of the air flow to be cooled.

3. **Flat refrigerating unit** for use with device, server or circuit cabinets or other essentially closed housing arrays for acceptance of heat-generating equipment, in which the temperature of heated air (SL)—in a countercurrent (L4; L3; k_1; k_2, etc.) with refrigerating air (KL) flowing in the opposite direction—can be reduced without the refrigerating air coming into contact with the airflow (L1, L3, L5) to be cooled;
characterized in that
   (a) the airflow to be cooled (SL) can be supplied to a plurality of parallel first chambers (k1, k3, k7) through an inlet area (13), and the refrigerating air (KL) can be supplied to a plurality of parallel second chambers (k2, k4, k6), wherein the parallel first and the parallel second chambers alternate in the direction of the height or thickness (h) of the refrigerating unit;
   (b) the alternating chambers (k1, k2, k3, k4, etc.) also extend (l_{13}) in a segment of the flat refrigerating unit, which is disposed between the inlet area (13) and a closer (first) end (40, 41) of the refrigerating unit, especially the end of the refrigerating unit at which the refrigerating air (KL) is the exhaust air (AL) that can be discharged as a result of cooling.

4. **Flat refrigerating unit** for use with device, server or circuit cabinets or other essentially closed housing arrays for acceptance of heat-generating equipment, in which the temperature of heated air (SL)—in a countercurrent (L4; L3; k_1; k_2, etc.) with refrigerating air (KL) flowing in the opposite direction—can be reduced without the refrigerating air coming into contact with the air flow (L1, L3, L5) to be cooled;
characterized in that
   (a) the air flow to be cooled (SL) can be supplied to an outlet area (23) consisting of a plurality of parallel first chambers (k1, k3, k7), and the refrigerating air (KL) can be supplied to a plurality of parallel second chambers (k2, k4, k6), wherein the parallel first and the parallel second chambers alternate in the direction of the height or thickness (h) of the refrigerating unit;
   (b) the alternating chambers (k1, k2, k3, k4, etc.) also extend (l_{13}) in a segment of the flat refrigerating unit, which is disposed between the outlet area (23) and a closer (second) end (40, 41) of the refrigerating unit, especially the end at which the refrigerating air (KL) is meant to flow in.

5. **Flat refrigerating unit** for use with device, server or circuit cabinets or other essentially closed housing arrays for acceptance of heat-generating equipment, in which the temperature of heated air (SL)—in a countercurrent (L4; L3; k_1; k_2, etc.) with refrigerating air (KL) flowing in the opposite direction—can be reduced without the refrigerating air coming into contact with the air flow (L1, L3, L5) to be cooled;
characterized in that
   (a) flat channels progress in parallel to a flat side (51, 50) of the flat refrigerating unit, wherein the channels have a length (l) and a width (b) in a respective plan that extends, in each case, in parallel to the flat side, and wherein
   (b1) a height of the channels (h1, h2) perpendicular to the flat side (51, 52) and/or the respective plane is significantly less than the width (b) of the channels, in order to form flat channels (k1, k2, k3, etc.); or
   (b2) the flat channels (k1, k2, k3, etc.) extend to an size that essentially corresponds to an entire flat side (50) of the flat refrigerating unit.

6. **Flat refrigerating unit** for use with device, server or circuit cabinets or other essentially closed housing arrays for acceptance of heat-generating equipment, in which the temperature of heated air (SL)—in a countercurrent (L4; L3; k_1; k_2, etc.) with refrigerating air (KL) flowing in the opposite direction—can be reduced without the refrigerating air coming into contact with the air flow (L1, L3, L5) to be cooled;
characterized in that
   (a) sealing separating elements (12a, 12b, 12c; 22a, 22b, 22c) for the air to be cooled are provided in an inflow area (13, 11) and/or in an outflow area (23, 21), with which first channels (k1, k3, k5) for the air to be cooled (L3) are separated from second channels (k2, k4, k6) for the refrigerating air (L4);
   (b) the separating elements (12a, 22a, etc.) that seal the inflow area (11) or outflow area (21) of the air to be cooled (L3) against the refrigerating air (L4) can be completely flushed by the air flow of the refrigerating air and the air to be cooled.

7. Refrigerating unit according to at least two of the preceding claims 1 to 6.

8. Refrigerating unit according to one of the preceding claims, wherein the fans (30, 31; 40, 41, 10) are executed as axial fans.

9. Refrigerating unit according to one of the preceding claims, wherein the (flat) chambers (k1, k2, k3, k4) are separated from one another by sheet metal panels (50a, 50b, 50c, etc.) and the heights (h1, h2, etc.) of the chambers are formed by a distance between the panels.

10. Refrigerating unit according to one of the preceding claims, wherein, at the inlet area and the outlet area (13, 23) of both the refrigerating air and the air to be cooled, fin elements (12, 42, 22, 32) are provided between the sheet metal panels (50a, 50b) two-dimensionally delimiting the chambers and/or to close the chambers that are not open at the respective location.

11. Refrigerating unit according to claim 9 or 10, wherein the sheet metal panels are not smooth, and are, especially, corrugated or embossed.

12. Refrigerating unit according to one of the preceding claims, wherein blocking elements (28, 18) are provided in the inlet area for the air to be cooled (SL) and/or in the outlet area for the cooled air (DL), in order to block direct flow between the inlet area and the outlet area and extend the path of the air to be cooled in the chambers.

13. Refrigerating unit according to claim 12, wherein the blocking elements (18, 28) are adjustable.

14. Refrigerating unit according to claim 12 or 13, wherein the blocking elements are curved.

15. Refrigerating unit according to one of the preceding claims, wherein the inlet area (13, 11) and/or the outlet area (23, 21) are designed to be essentially round and/or, in a height extension (h) of the refrigerating unit, to be essentially cylindrical.

16. Refrigerating unit according to one of the preceding claims, wherein the third fan (10) at the inlet area (13, 11) for the air to be cooled (SL) can be operated at a rotation speed which is greater than a rotation speed of a fourth fan (20) at the outlet area for the cooled air (DL, 23), especially at more than 10% greater than the output of the fourth fan (20).

17. Refrigerating unit according to one of the preceding claims 1 to 15, wherein a fourth fan is disposed at the outlet area (21, 23) for the cooled air, said fourth fan being weaker than the third fan (10).

18. Refrigerating unit according to claim 9, wherein the distance between the sheet metal panels is determined by fins (12a, 42a, 22a, 32a), and the height (h1, h2) of each respective chamber corresponds to the fin height.

19. Refrigerating unit according to the preceding claim, wherein, in order to close each respective chamber, the fins are arranged in such a way that they tightly seal flat chambers for the air to be cooled at the inflow side (30) and outflow side (40) for the refrigerating air and tightly seal the flat chambers for the refrigerating air (KL, L4, AL) at the inflow area and outflow area for the air to be cooled (11, 21).

20. **Method** for cooling air from a device, server or circuit cabinet, or another essentially closed housing array for acceptance of heat-generating equipment, in which the temperature of heated air (SL)—in a countercurrent (L4; L3; k_1; k_2, etc.) with refrigerating air (KL) flowing in the opposite direction—can be reduced without the refrigerating air coming into contact with the air flow (L1, L3, L5) to be cooled;
characterized in that the refrigerating air (KL, AL) flows **past** an inlet area (13, 11) for the airflow to be cooled (SL, L1) and/or **in front of** an outlet area (21, 33) for the airflow (L5, DL) already cooled upstream and downstream from the inlet/outlet.

21. Method according to claim 20, wherein the flow past the inlet area and/or the flow in front of the outlet area occurs at a width (b1+b2; b3+b4) which is not less than, and is, especially, essentially equal to or greater than a width, especially a diameter (d_{13}, d_{23}), of the inflow area (13) or of the outflow area (23).

22. Method according to claim 20, wherein the air to be cooled and the refrigerating air (L3, L4) flows in two-dimensionally extended layers, the height (h1, h2) of which is sufficient only to encourage turbulent flow in the layers.

23. Method according to claim 22, wherein the height of the layers is less than 10 mm, or preferably less than 5 mm.

24. Method according to claim 20, wherein the heated air (SL) supplied with a third fan (10) is supplied more intensely, especially at greater output, than that of a fourth fan (20), which extracts the air cooled in the refrigerating unit from the refrigerating unit in the outlet area (23, 21).

25. Method according to claim 20, wherein a refrigerating unit according to one of claims 1 to 7 is used.

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